

**We Claim:**

1. An automated method for measuring benefits accruing from the management of knowledge in a self-assessing knowledge sharing community, or a plurality of communities and sub-communities, said method comprising the steps of:
  - storing knowledge assets in a repository, preferably in a computer-readable format,
  - cataloguing of knowledge assets for easy retrieval by classifying them against a multi-dimensional knowledge hierarchy,
  - receiving new knowledge assets from members of the community,
  - validating, reviewing and rating of the new knowledge assets by assigned members of the community,
  - storing and publishing the validated knowledge in the repository,
  - reviewing and rating of published knowledge assets by any member of the community,
  - calculating a composite rating for knowledge assets based on an aggregation of ratings and usage over time of the knowledge assets in the community,
  - calculating an aggregate rating for a member in each community based on the contributions of the member to the community,
  - calculating an aggregate rating for each community based on the ratings of all its members, and
  - calculating and displaying on a scoreboard, various ratings for members, communities, and sub-communities.
2. The method as claimed in claim 1, wherein knowledge assets include documents, discussion threads, profiles of experts, and records of knowledge sharing sessions.
3. The method as claimed in claim 1, further comprising the step of aggregating knowledge assets from a central repository with those from a plurality of satellite repositories.

4. The method as claimed in claim 1, wherein cataloguing of knowledge assets is determined by a multi-dimensional knowledge hierarchy used for the classification of all types of knowledge assets in the knowledge repository including expert profiles, for the selection of reviewers for reviewing submitted assets, and for the organization of sub-communities into communities.
5. The method as claimed in claim 1, wherein the metrics for rating knowledge assets also determine the metrics for calculating the contributions of a member or community, for rewarding members for their contributions, and for calculating the overall benefits to a community.
6. The method as claimed in claim 1, wherein the rating and reviewing of knowledge assets by assigned members at the time of publishing comprises the steps of:
- selecting one or more reviewers by matching the knowledge nodes and paths of the asset with those of the expert profiles of members in the community, using the knowledge hierarchy,
  - assigning of ratings to the knowledge assets by the reviewer(s), and
  - entering of comments by the reviewer visible to all members of the community as well as private comments visible only to the author(s) of the knowledge asset.
7. The method as claimed in claim 6, wherein the rating and associated comments of each knowledge asset by a reviewer can be revised repeatedly.
8. The method as claimed in claim 6, wherein the step of assignment of ratings by a reviewer to the knowledge asset includes:
- normalizing the rated points to a scale of points whose range is determined by the type of the knowledge asset, and,

- awarding the rated points to each of the author(s) of the knowledge asset either in their entirety or with an apportionment in the case of a plurality of authors.

- 5     9.     The method as claimed in claim 6, wherein a predetermined fraction of the maximum number of points possible in the range of points for the type of the reviewed knowledge asset is accrued to the reviewer(s).
- 10     10.     The method as claimed in claim 1, wherein reviewing and rating of a knowledge asset after publishing can be conducted by any member of the community other than an author or reviewer of the knowledge asset along with comments that are accessible to all members of the community.
- 15     11.     The method as claimed in claim 10, wherein the rating of each published knowledge asset and associated comments can be revised repeatedly if desired.
12.     The method as claimed in claim 10, wherein the rating assigned to a knowledge asset by a member is accrued to the knowledge asset.
- 20     13.     The method as claimed in claim 10, wherein the ratings assigned by a member to a knowledge asset includes:
- normalizing the rated points to a scale of points whose range is determined by the type of the knowledge asset, and,
  - accrual of the rated points to each of the authors of the knowledge asset
- 25           either in their entirety or with an apportionment in case of a plurality of authors.
- 30     14.     The method as claimed in claim 10, wherein a predetermined fraction of the maximum number of points possible in the range of points for the type of the knowledge asset rated is accrued to the member who contributes the rating.

15. The method as claimed in claim 1, wherein calculating the composite ratings of knowledge assets comprises the steps of calculating:

- reviewer ratings as the arithmetic mean of all the reviewer ratings given to the knowledge asset,
- 5 - member ratings as the arithmetic mean of all the member ratings given to the knowledge asset,
- frequency of usage as a fraction in exponential relation to the ratio of the number of times the knowledge asset is used by members to the arithmetic mean of the numbers of times all knowledge assets of the same type in the community are used by members,
- 10 - recency of usage as a discrete integral over time of the product of the arithmetic mean of the ratings given to the knowledge asset by members in a window, from a set of windows of equal time intervals, and a corresponding fraction from a predetermined set of time-varying fractions that sum up to 1.0,
- 15 - the weighted sum of the reviewer rating, member rating, frequency of usage and recency of usage, where the weight for reviewer rating is greater than the weight for member rating and the sum of the four weights is equal to 1.0,
- 20 - the composite rating for the knowledge asset as the weighted sum normalized to a predetermined scale.

16. The method as claimed in claim 15 wherein the weighted sum is normalized on a scale of 1 to 10.

17. The method as claimed in claim 1 further comprising the step of retrieving knowledge assets against nodes in the knowledge hierarchy, in combination with keywords, dates, and other query elements, in either descending or ascending order of their composite ratings.

18. The method as claimed in claim 1, wherein calculating the aggregate rating of a member or a former member in a particular community further comprises the steps of calculating:

- reviewer accruals as zero for former members and, for current members, as the sum of the points, over all reviews of knowledge assets done by the member in the community or any of its sub-communities,
- member rating accruals as zero for former members and, for current members, as the sum of the points, over all ratings of knowledge assets in the community or any of its sub-communities done by the member,
- author accruals from reviewers as the sum of the points, over all reviews of knowledge assets authored by the member in the community or any of its sub-communities,
- author accruals from members as the sum of the points, over all ratings of knowledge assets authored by the member in the community or any of its sub-communities, and
- the aggregate rating as the sum of the reviewer accruals, member rating accruals, author accruals from reviewers and author accruals from members.

19. The method as claimed in claim 18, wherein a member's current aggregate rating in a community is made accessible on the scoreboard to all members of the community.

20. The method as claimed in claim 18, wherein the break-up of the rating of a member in a community into points obtained from reviewer and member ratings

of knowledge assets authored by the member, points obtained by reviewing other member's assets, and points obtained by rating other members' assets are accessible on the scoreboard to all members of the community.

- 5     21.     The method as claimed in claim 18 wherein the list of a subset of members in a community with the highest aggregate ratings, including the highest number of points accrued as authors, and highest number of points accrued as reviewers are accessible on the scoreboard to all members of the community.
- 10    22.     The method as claimed in claim 1, wherein the aggregate rating of a community is calculated as the sum, over all members including former members of the community, of the aggregate ratings of each member in that community.
- 15    23.     The method as claimed in claim 22, wherein the aggregate rating of the community is accessible on the scoreboard to all members of the community.
24.     The method as claimed in claim 18, wherein the members in a community can redeem their points in exchange for rewards.
- 20    25.     The method as claimed in claim 24 wherein the redeemable points of a member in a community are calculated as the sum of the reviewer accruals, author accruals and member rating accruals of the member, considering only the knowledge assets in the community and not those in sub-communities.
- 25    26.     The method as claimed in claim 24, wherein a member can redeem some of his/her redeemable points to obtain multiple types of rewards at a rate of exchange of points to particular rewards predetermined by the community.
- 30    27.     The method as claimed in claim 26, wherein the community periodically adjusts the exchange rates for different rewards depending on the availability of resources for giving rewards.

28. The method as claimed in claim 26, wherein the community periodically sets certain blackout periods during which points cannot be redeemed.
- 5 29. The method as claimed in claim 26, wherein each member can redeem his/her points only above a certain minimum number of points, predetermined by the community, that the member is required to maintain at all times.
- 10 30. The method as claimed in claim 26, wherein the member can redeem points only in multiples of a predetermined number of points.
31. The method as claimed in claim 26, wherein redeeming points does not alter the aggregate rating of the member.
- 15 32. The method as claimed in claim 26, wherein a point can be redeemed only once.
33. The method as claimed in claim 24, wherein multiple types of rewards are awarded to members on achieving predetermined milestones in their points in the community.
- 20 34. The method as claimed in claim 24, wherein points once assigned to a member can be withdrawn or reduced by the community.
- 25 35. The method as claimed in claim 1 optionally comprising the step of retirement of knowledge assets.
- 30 36. The method as claimed in claim 35 wherein the knowledge asset is retired based on one or more of the following conditions:  
- after a pre-determined period of time has elapsed,  
- after a reviewer marks the knowledge asset as obsolete, and

- after the composite rating of the asset over a pre-determined period of time falls below a certain threshold limit.

37. The method as claimed in claim 35, wherein retiring a knowledge asset comprises the step of archiving it and making it inaccessible to members of the community.

38. An automated system for measuring benefits accruing from the management of knowledge in a self-assessing knowledge sharing community, or a plurality of communities and sub-communities, comprising:

- a repository for storing knowledge assets preferably in a computer-readable format,
- a catalogue for cataloguing the knowledge assets for easy retrieval by classifying them against a multi-dimensional knowledge hierarchy,
- means for receiving new knowledge assets from members of the community,
- means for validating, reviewing and rating of the new knowledge assets by assigned members of the community,
- means for storing and publishing the validated knowledge in the repository,
- means for reviewing and rating of published knowledge assets by any member of the community,
- calculating means for a composite rating for knowledge assets based on an aggregation of ratings and usage over time of the knowledge assets in the community,
- calculating means for an aggregate rating for a member in each community based on the contributions of the member to the community,
- calculating means for an aggregate rating for each community based on the ratings of all its members, and



- means for calculating and displaying on a scoreboard various ratings for members, communities, and sub-communities.

39. The system as claimed in claim 38, wherein knowledge assets include documents,  
5 discussion threads, profiles of experts, and records of knowledge sharing sessions.
40. The system as claimed in claim 38, wherein the repository includes a plurality of repositories connected to each other.
- 10 41. The system as claimed in claim 38, further comprising means for aggregating knowledge assets to a central repository with those from a plurality of satellite repositories.
- 15 42. The system as claimed in claim 38, wherein means for cataloguing of knowledge assets includes a multi-dimensional knowledge hierarchy used as the means for the classification of all types of knowledge assets in the knowledge repository including expert profiles, the means for the selection of reviewers for reviewing submitted assets, and the means for the organization of sub-communities into communities.
- 20 43. The system as claimed in claim 42, wherein the knowledge hierarchy is arranged as one or more directed acyclic graphs.
- 25 44. The system as claimed in claim 38, wherein means for rating and reviewing of knowledge assets by assigned members at the time of publishing comprises:
  - means for selecting one or more reviewers by matching the knowledge nodes and paths of the asset with those of the expert profiles of members in the community, using the knowledge hierarchy,
  - 30 - means for assigning of ratings to the knowledge assets by the reviewer(s), and

- means for entering of comments by the reviewer visible to all members of the community as well as private comments visible only to the author(s) of the knowledge asset.

5     45.     The system as claimed in claim 44, wherein means for assignment of ratings by a reviewer to the knowledge asset includes:

- means for normalizing the rated points to a scale of points whose range is determined by the type of the knowledge asset, and
- means for awarding the rated points to each of the author(s) of the knowledge asset either in their entirety or with an apportionment in the case of a plurality of authors.

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15     46.     The system as claimed in claim 38, further comprising means for reviewing and rating of a knowledge asset after publishing by any member of the community other than an author or reviewer of the knowledge asset along with comments that are accessible to all members of the community.

20     47.     The system as claimed in claim 46, wherein means for assigning the rating by a member to a knowledge asset includes:

- means for normalizing the rated points to a scale of points whose range is determined by the type of the knowledge asset, and,
- means for accruing of the rated points to each of the authors of the knowledge asset either in their entirety or with an apportionment in the case of a plurality of authors.

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30     48.     The system as claimed in claim 38, wherein means for calculating the composite ratings of knowledge assets comprises:

- means for calculating reviewer ratings as the arithmetic mean of all the reviewer ratings given to the knowledge asset,
- means for calculating member ratings as the arithmetic mean of all the member ratings given to the knowledge asset,

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- means for calculating frequency of usage as a fraction in exponential relation to the ratio of the number of times the knowledge asset is used by members to the arithmetic mean of the numbers of times all knowledge assets of the same type in the community are used by members,
  - means for calculating recency of usage as a discrete integral over time of the product of the arithmetic mean of the ratings given to the knowledge asset by members in a window, from a set of windows of equal time intervals, and a corresponding fraction from a predetermined set of time-varying fractions that sum up to 1.0,
  - means for calculating the weighted sum of the reviewer rating, member rating, frequency of usage and recency of usage, where the weight for reviewer rating is greater than the weight for member rating and the sum of the four weights is equal to 1.0,
  - means for calculating the composite rating for the knowledge asset as the weighted sum normalized to a predetermined scale.
49. The system as claimed in claim 38, further comprising means for retrieving knowledge assets against nodes in the knowledge hierarchy, in combination with keywords, dates, and other query elements, in either descending or ascending order of their composite ratings.
50. The system as claimed in claim 38, wherein means for calculating the aggregate rating of a member or a former member in a particular community further comprises:
- means for calculating reviewer accruals as zero for former members and, for current members, as the sum of the points, over all reviews of knowledge assets done by the member in the community or any of its sub-communities,

- means for calculating member rating accruals as zero for former members and, for current members, as the sum of the points, over all ratings of knowledge assets in the community or any of its sub-communities done by the member,

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- means for calculating author accruals from reviewers as the sum of the points, over all reviews of knowledge assets authored by the member in the community or any of its sub-communities,

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- means for calculating author accruals from members as the sum of the points, over all ratings of knowledge assets authored by the member in the community or any of its sub-communities, and

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- means for calculating the aggregate rating as the sum of the reviewer accruals, member rating accruals, author accruals from reviewers and author accruals from members.

51. The system as claimed in claim 50, comprising means for redemption of points by the members in exchange for rewards.

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52. The system as claimed in claim 51, comprising means for calculating the redeemable points of a member in a community as the sum of the reviewer accruals, author accruals and member rating accruals of the member, considering only the knowledge assets in the community and not those in sub-communities.

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53. The system as claimed in claim 51, comprising means for withdrawing or reducing by the community, the points once assigned to a member.

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54. The system as claimed in claim 38, optionally comprising means for retirement of knowledge assets.

55. The system as claimed in claim 54, comprising means for retiring a knowledge asset includes means for archiving it and making it inaccessible to members of the community.
- 5 56. The system as claimed in claim 38, wherein said means wholly or partially reside on a computing system comprising:
- at least one system bus,
  - at least one communications unit connected to the system bus,
  - 10 - a memory unit including a set of instructions connected to the system bus, and
  - at least one control unit executing the instructions in the memory for the functioning of said means.
- 15 57. The system as claimed in claim 56, further connected to other similar systems and database systems that may contain means to complement and supplement the already existing means.
- 20 58. The system as claimed in claim 57, wherein said systems are interconnected through any suitable computer network including Ethernet, Internet, LAN, WAN, and MAN using any desired network topology including ring, bus and star.
- 25 59. A computer program product comprising computer readable program code stored on computer readable storage medium embodied therein for providing an automated system for measuring benefits accruing from the management of knowledge in a self-assessing knowledge sharing community, or a plurality of communities and sub-communities, comprising:
- computer readable program code configured for storing knowledge assets in a repository, preferably in a computer-readable format,
  - 30 - computer readable program code configured for cataloguing the knowledge assets for easy retrieval by classifying them against a multi-dimensional knowledge hierarchy,

- computer readable program code configured for receiving new knowledge assets from members of the community,
  - computer readable program code configured for validating, reviewing and rating of the new knowledge assets by assigned members of the community,
  - computer readable program code configured for storing and publishing the validated knowledge in the repository,
  - computer readable program code configured for reviewing and rating of published knowledge assets by any member of the community,
  - computer readable program code configured for calculating a composite rating for knowledge assets based on an aggregation of ratings and usage over time of the knowledge assets in the community,
  - computer readable program code configured for calculating an aggregate rating for a member in each community based on the contributions of the member to the community,
  - computer readable program code configured for calculating an aggregate rating for each community based on the ratings of all its members, and
  - computer readable program code configured for calculating and displaying on a scoreboard various ratings for members, communities, and sub-communities.
- 25 60. The computer program product as claimed in claim 59, wherein knowledge assets include documents, discussion threads, profiles of experts, and records of knowledge sharing sessions.
- 30 61. The computer program product as claimed in claim 59, further comprising computer readable program code configured for aggregating knowledge assets to a central repository with those from a plurality of satellite repositories.

5 62. The computer program product as claimed in claim 59, comprising computer readable program code configured for cataloguing of knowledge against a multi-dimensional knowledge hierarchy used for the classification of all types of knowledge assets in the knowledge repository including expert profiles, for the selection of reviewers for reviewing submitted assets, and for the organization of sub-communities into communities.

10 63. The computer program product as claimed in claim 59, wherein computer readable program code for rating and reviewing of knowledge assets by assigned members at the time of publishing comprises:

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- computer readable program code configured for selecting one or more reviewers by matching the knowledge nodes and paths of the asset with those of the expert profiles of members in the community, using the knowledge hierarchy,
  - computer readable program code configured for assigning of ratings to the knowledge assets by the reviewer(s), and
  - computer readable program code configured for entering of
- 20 comments by the reviewer visible to all members of the community as well as private comments visible only to the author(s) of the knowledge asset.

25 64. The computer program product as claimed in claim 63, wherein computer readable program code for assignment of ratings by a reviewer to the knowledge asset includes:

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- computer readable program code configured for normalizing the rated points to a scale of points whose range is determined by the type of the knowledge asset, and,
  - computer readable program code configured for awarding the rated points to each of the author(s) of the knowledge asset either in their entirety or with an apportionment in the case of a plurality of authors.

5 65. The computer program product as claimed in claim 59, further comprising computer readable program code configured for reviewing and rating of a knowledge asset after publishing by any member of the community other than an author or reviewer of the knowledge asset along with comments that are accessible to all members of the community.

10 66. The computer program product as claimed in claim 65, wherein computer readable program code for assigning the rating by a member to a knowledge asset includes:

- computer readable program code configured for normalizing the rated points to a scale of points whose range is determined by the type of the knowledge asset, and,
- 15 - computer readable program code configured for accruing of the rated points to each of the authors of the knowledge asset either in their entirety or with an apportionment in the case of a plurality of authors.

20 67. The computer program code as claimed in claim 59, wherein computer readable program code for calculating the composite ratings of knowledge assets comprises:

- 20 - computer readable program code configured for calculating reviewer ratings as the arithmetic mean of all the reviewer ratings given to the knowledge asset,
- computer readable program code configured for calculating member ratings as the arithmetic mean of all the member ratings given to the knowledge asset,
- 25 - computer readable program code configured for calculating frequency of usage as a fraction in exponential relation to the ratio of the number of times the knowledge asset is used by members to the arithmetic mean of the numbers of times all knowledge assets
- 30 of the same type in the community are used by members,



- 5                   -     computer readable program code configured for calculating  
                    recency of usage as a discrete integral over time of the product of  
                    the arithmetic mean of the ratings given to the knowledge asset by  
                    members in a window, from a set of windows of equal time  
                    intervals, and a corresponding fraction from a predetermined set of  
                    time-varying fractions that sum up to 1.0,
- 10                  -     computer readable program code configured for calculating the  
                    weighted sum of the reviewer rating, member rating, frequency of  
                    usage and recency of usage, where the weight for reviewer rating is  
                    greater than the weight for member rating and the sum of the four  
                    weights is equal to 1.0, and
- computer readable program code configured for calculating the  
                    composite rating for the knowledge asset as the weighted sum  
                    normalized to a predetermined scale.

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68.     The computer program product as claimed in claim 59, further comprising  
computer readable program code configured for retrieving knowledge assets  
against nodes in the knowledge hierarchy, in combination with keywords, dates,  
and other query elements, in either descending or ascending order of their  
20     composite ratings.

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69.     The computer program product as claimed in claim 59, wherein computer  
readable program code for calculating the aggregate rating of a member or a  
former member in a particular community further comprises:

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- computer readable program code configured for calculating  
reviewer accruals as zero for former members and, for current  
members, as the sum of the points, over all reviews of knowledge  
assets done by the member in the community or any of its sub-  
communities,

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- 5                   -     computer readable program code configured for calculating member rating accruals as zero for former members and, for current members, as the sum of the points, over all ratings of knowledge assets in the community or any of its sub-communities done by the member,
  - 10                  -     computer readable program code configured for calculating author accruals from reviewers as the sum of the points, over all reviews of knowledge assets authored by the member in the community or any of its sub-communities,
  - 15                  -     computer readable program code configured for calculating author accruals from members as the sum of the points, over all ratings of knowledge assets authored by the member in the community or any of its sub-communities, and
  - 20                  -     computer readable program code configured for calculating the aggregate rating as the sum of the reviewer accruals, member rating accruals, author accruals from reviewers and author accruals from members.
70.     The computer program product as claimed in claim 69, comprising computer readable program code configured for calculating the redeemable points of a member in a community as the sum of the reviewer accruals, author accruals and member rating accruals of the member, considering only the knowledge assets in the community and not those in sub-communities.
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71.     The computer program product as claimed in claim 69, comprising computer readable program code configured for withdrawing or reducing by the community, the points once assigned to a member.
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72. The computer program product as claimed in claim 59, optionally comprising the computer readable program code configured for retirement of knowledge assets.
- 5 73. The computer program product as claimed in claim 72, comprising the computer readable program code configured for retiring any knowledge asset by archiving it and making it inaccessible to members of the community.
- 10 74. An automated method for measuring benefits accruing from the management of knowledge in a self-assessing knowledge sharing community, or a plurality of communities and sub-communities as and herein described with reference to the accompanying figures.
- 15 75. An automated system for measuring benefits accruing from the management of knowledge in a self-assessing knowledge sharing community, or a plurality of communities and sub-communities as and herein described with reference to the accompanying figures.
- 20 76. A computer program product for providing an automated method for measuring benefits accruing from the management of knowledge in a self-assessing knowledge sharing community, or a plurality of communities and sub-communities as and herein described with reference to the accompanying figures.

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